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ABSTRACT

The object of this study was to determine the extent to which children displayed predictable, recurring patterns of behavior when engaged in self-selected activities. Subjects were four girls and three boys, 4 years of age, all from middle class urban families. The classroom's free play space was divided into four equal areas. Toys were divided into four groups: art materials, blocks, dramatic toys, and manipulative toys and books. Each day the toy groups were randomly assigned to the four areas, with each free play session being videotaped simultaneously from two directions. Observer recordings of each child's movements and the toys he used were summarized, coded, and analyzed. Significant differences were found in the time spent by children in specific physical locations. These differences were related to the nature of the area and the proximity of the play materials to the teacher. Children tended to choose play materials that could be moved to another area of the room. Differences in the nature of independent and group play were related to materials and location. (DR)

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CHARACTERIZATION OF THE EFFECT OF SPACE, MATERIALS, AND TEACHER BEHAVIOR ON PRESCHOOL CHILDREN'S FREE PLAY ACTIVITY PATTERNS

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Characterization of the Effect of Space, Materials, and Teacher Behavior on Preschool Children's Free Play Activity Patterns

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The advent of Head Start has stimulated considerable research effort in preschool program evaluation, but free play, or self selected activities, have received little recent attention despite their frequent inclusion in nursery school classes. It has long been intuitively recognized that children's behavior is modified by the physical environment, but little attempt has been made to control physical variables during observation of free play behavior. Past studies of free play generally have not quantified the physical setting, thereby precluding the evaluation of environmentally induced biases in behavior (cf. Varner, 1964, pp 4-10). The most thorough study of children's behavior in a free play setting was done by Shure (1961, 1963). Adapting Barker and Wright's concept of behavioral settings, Shure described the influence of these settings "on the spontaneous behavior of preschool children as it occured within certain areas of the indoor nursery school setting" (p.979). Shure's study was a naturalistic one, and to date an extreme dearth of controlled ecological research exists with regard to the preschool.

The goal of this preliminary study was to gain initial leverage concerning the nature of children's activity patterns while controlling teacher behavior, space allotted per activity area, and location of activity areas within the playroom.

Design and Procedures

Subjects

The subjects (S's) used in this pilot study were four girls and three boys ranging in age from four years, three months to four years, eight months. All of the children were from middle class urban families and had attended the University Preschool during the year prior to the summer of the present study.

Setting

The total daily program (2 1/2 hours/day) simulated that of a standard preschool program. Activities included indoor free play, teacher-directed group activities, a snack period, and outdoor free play. Only the indoor free play period was included within the experimental framework. The free play space (FPS) was divided into four equal areas (Figure 1). Toys were

Figure 1

divided into four groupings: 1) Art, 2) Blocks, 3) Dramatic, and 4) Manipulative and Books (Table 1). Each day the toy groupings were randomly

Tables 1 and 2

assigned to the four locational areas (Table 2) and all materials were placed on shelves in each area. The teacher was located outside the actual activity areas. She remained in that area and did not initiate interaction with the children.

Procedure

As indicated in Figure 1, two video cameras were located at each end of the playroom. Each day's indoor free play period for the total setting

was videotaped using both cameras simultaneously. The S's attended school three consecutive days per week (Tuesday-Thursday) for three consecutive weeks. Videotaping began on the subject's first day of school, July 9, 1968 and ended on July 24, 1968. The videotapes thus represent a simultaneous and sequential observational record of the entire free play period for all subjects throughout the pilot study.[1]

The movements of each child, in addition to the toys he used, were recorded by observers during videotape playback. Time intervals for observer recording were arbitrarily set at 30-seconds. The total observational time per day was 55 minutes, or 110 thirty-second intervals per child. A given observer recorded the movements of one child at a time, recording in sequence all the areas of the experimental FPS through which the child moved during each thirty-second interval. In addition, the observer recorded all toys touched by the child during each interval. In addition to the four areas, it was necessary to add a classification for the area between areas 2 and 3 (designated as 2/3) and also for the teacher's area (designated as T) to be used when the child was either directly interacting with the teacher, physically close to the teacher, or attending to the teacher's activities (Table 3).

Results

Space

The mean number of thirty-second intervals spent by children in given physical locations, as indicated in Table 4, is higher for areas 2 and 3

[1] Due to mechanical difficulties, no film was obtained for July 16, 1968.

Table 4

than for areas 3 and 4. Using a randomized block design, a two-way analysis of variance indicates this difference was significant at the .01 level (F 1, 6 = 30.73). The mean number of 30-second intervals spent by children in given activity areas is given in Table 5. The Block area had the highest activity level while the Dramatic area had the lowest.

Table 5

A similar two-way analysis of variance, however, revealed no significant difference in the time spent in various activity areas.

The mean number of 30-second intervals spent by children alone in an area was highest for the Manipulative/ Book area and was lowest for the

Table 6

Dramatic area. The mean number of the 30-second intervals spent by children in an area with other children was highest for the Block area and lowest for the Dramatic area.

Table 7 indicates that the mean number of 30-second intervals spent by children in an area alone was higher for the combined 2 and 3 areas

Table 7

than for the combined 1 and 4 areas. Similarly, the mean number of 30-second intervals spent by children in an area with other children was higher for the 2 and 3 areas than for the 1 and 4 areas. An analysis of the variance of the number of intervals in such areas indicated a significant difference ($P = <.01$) between groups for children spending time alone

in a physical area (F 1, 6 = 33.82) and for children spending time with other children in a physical location area (F 1, 6 = 23.60).

Materials

Table 8 reveals that the mean amount of time spent with toys in their area of origin (i.e. using block toys in the Block area) was highest for the Art materials and lowest for the Block toys. No significant difference in the time spent with various classes of toys in their area of origin was evident. However, a two-way analysis of variance indicated significance at the .01 level (F 3, 18 = 25.47) for the difference in time spent with toys outside the area of origin (i.e. using block toys in the art area). The mean time spent was highest for the Manipulative/Book toys and was lowest for the Art materials. The mean amount of time spent with toys,

Table 8

both inside and outside the area of origin, was highest for the Manipulative/ Book toys and lowest for the Blocks, which was a significant difference. (P = <.01, F 3, 18 = 7.46).

The number of different toys that children used differed over time child to child. (P = <.05). Likewise, there was, with the exception of

Table 9

Art materials, a significant difference over time in the number of toys used within classes of materials, again over time (Table 10).

Table 10

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Table 11 indicates that the mean number of times children move toys

Table 11

to specified areas was higher for the combined 2 and 3 areas than for the combined 1 and 4 areas. A two-way analysis of variance revealed a significant difference at the .05 level of probability ($F_{1, 6} = 8.48$).

Discussion

A number of questions that would seem to provide initial leverage on the issue of children's play activity in relation to space and materials were asked of the data. They are listed below and are discussed in order.

Questions

1. Is there a difference in the time spent in given physical locations? (Areas 1 and 4, far areas- teacher; areas 2 and 3, near areas - teacher)?

2. Is there a difference in the time (30-second intervals) spent by children in given activity areas? (A, B, D, M)

3. Does the amount of time children spend alone in given activity areas vary significantly?

4. Is the amount of time children spend with other children, in given activity areas, different?

5. Does the amount of time children spend alone, in given physcial locations, vary significantly?

6. Is the amount of time children spend with other children, in given physical locations, significant?

Materials

7. Does the amount of time spent with toys, in their area of origin, differ significantly?

8. Does the amount of time spent with toys, outside their area of origin, differ significantly?

9. Does the amount of time spent with toys, both inside and outside the area of origin, differ significantly?

10. Does the number of toys children use differ significantly over time?

11. Does the number of toys, within specific toy grouping, children use differ significantly over time?

12. Is there a significant difference in the amount of time children spend moving toys, either near the teacher or away from the teacher?

SPACE

With teacher behavior, space alloted per activity area, and location of activity areas strictly controlled within the FPS, no significant differences were found in the time spent by children in specified activity areas of FPS. Significant differences apparently, however, were in the time spent by children in specified physical locations, notably areas 2 and 3, (near the teacher's location). In the absence of experimental data it cannot be stated explicitly that a direct causal relationship exists between the location of the teacher and children's activity patterns in a free play setting. However, in light of these data, the "free-ness" of free play must be questioned as suspect.

Shure (1961,1963) found that the number of appearances made by children differed significantly from activity to activity area, with the greatest population density in the block area. For comparative purposes data were analyzed for population density, according to Shure's definition

and method of analysis (1961, pp. 19-21, 28). Analysis revealed a significant difference at the .001 level, ($F = 58.45$) with the density highest for the block area and lowest for the dramatic area. The priorities of activity areas as interpreted by the number of appearances made by children in activity areas generally concur with those of Shure. In the present study, using four sub-areas within the FPS, the area priorities were as follows: 1) Block; 2) Art; 3) Manipulative/Book; 4) Dramatic. In Shure's study, with five areas, the priorities were as follows: 1) Block; 2) Art; 3) Games (similar to Manipulative); 4) Doll (similar to Dramatic); .5) Books. While area priorities were similar in the two studies, as Table 12 illustrates, the differences between the priorities of individual activity areas contrast markedly. In this study there were only slight differences between activity area priorities, with the exception of the dramatic area, showing the most marked difference. In Shure's study, however, the differences were reversed, with the first ranked block area showing the most marked difference from the other activity areas.

Table 12

In the present study, the low population density of the dramatic area may have been a reflection of the fact that while the activity area locations were randomized, the dramatic area was located in areas 2 or 3 (near the teacher) only twice and in areas 1 or 4 (away from the teacher) five times during the study.[1] Shure's was a naturalistic study and therefore spatial

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[1] Due to unforeseen mechanical difficulties no film was obtained for one day, thus biasing the randomization of activity area locations. On the day when no film was obtained the dramatic area was located in area 2 (near the teacher).

allocation for activity areas and teacher behavior were not comtrolled. The block area, which Shure found to have the highest population density, was physically larger than any other area and was located in a room separate from the other activity areas. While no mention was made of the teacher's location in the play area, block play is generally supervised continually by an adult. Therefore, both the disproportionate size of the block area and the liklihood of teacher presence in the area may have accounted for Shure's results.

MATERIALS

The mean amount of time spent with toys in their area of origin was not significant. However, there was a significant difference in the amount of time spent highest for Manipulative/Book toys. Furthermore, there was a significant difference in the number of times children moved toys to specified locations, with the mean number of times highest for the combined 2 and 3 areas. Other projects which have dealt with children's play preferences in free play settings have conflicting findings and offer little in the way of conclusive comparative data. For example, some studies found children played with blocks with the highest frequency e.g. (Hulson, 1930; McDowell, 1937), while others found no significant difference in the amount of time children spent in activities e.g. (Childs, 1944; Varner, 1964).

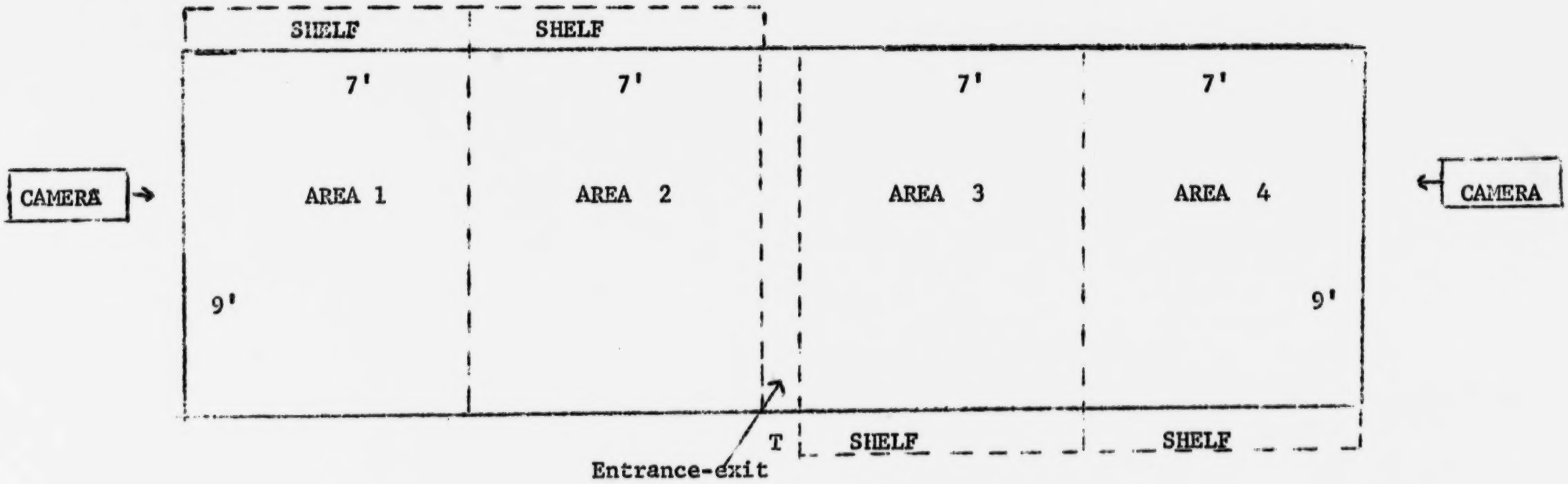
Data from the present study seem to indicate that the choice of materials was dictated, at least in part, on the basis of whether the toys could be moved to an area nearer the teacher. For example, mean time spent with toys outside their area of origin was highest for the Manipulative/book

materials and lowest for Art materials. These findings may well reflect the fact that most of the toys classified in the Manipulative/book grouping were portable and were easily used anywhere in the playroom. In contrast, the Art materials were generally more stationary, as many materials either needed to be used on a table (e.g. finger paint, play dough) or were not movable by a child (e.g. the easel).

The results of this preliminary atudy, although limited, would seem to provide direction for future experimental analyses of free play settings. Numerous questions seem apparent from these data. For example, could children's activity patterns be modified by manipulation of the space alloted per activity area? How would activity patterns be affected if one area were twice the size of the remaining areas? How would patterns be modified if all areas were larger or smaller than in the present study? In regard to the effect of teacher behavior on activity patterns, what differences would occur if the teacher were located in one specific activity area? Would behavior be modified if the teacher moved constantly and/or systematically from area to area? What would be the effects of simultaneous manipulation of teacher behavior and space allocation? These are merely a few questions to be pursued experimentally with a large sample of children and a number of different teachers. Further qualitiative analysis of children's behavior in a free play setting, similar to that done by Shure (1961,1963), should be done in conjunction with experimental manipulation thus providing a fuller picture of children's behavior. For example, what type of social interaction occurs among children in various activity ateas within the context of specified experimental manipulation?

Figure 1

Experimental Setting



T = Teacher Location

Table 1

Toy Groupings

Art (A)

1 Chalk
2 Collage
3 Crayons
4 Dough
5 Easel
6 Finger paint
7 Masking tape
8 Object paint
9 Paper
10 Paste
11 Payons
12 Pencils
13 Scissors
14 Stamps & ink pads
15 Squeeze paint
16 Toothbrush
17 Utensils (dough)

Blocks (B)

1 Animals
  Domestic
  Wild

2 Building blocks,
  (large, wooden)

3 Cars, small
  (& trucks)

4 Cardboard blocks
5 Cube blocks
  (colored)

6 People (rubber)
7 Train, large
8 Train, small
  (wooden)

9 Trucks, two large
10 Unit blocks

Dramatic (D)

1 Cash register
2 Dishes
3 a Doll
  b Clothes

4 Doctor
  a Stethoscope
  b Syringe
  c Uniform

5 Feminine dress-up
  a Hat
  b Purse
  c Skirt
  d Shoes

6 Fireman
  a Boots
  b Cape
  c Hat

7 Fruit
8 Grocery
  a Bags
  b Cans
  c Food

9 Masculine dress-up
  a Coat
  b Hat
  c Shoes

10 Mirror

Manipulative/Books (M)

1 (12) Books
  (on separate shelf)

2 Clowns (plastic)
3 Color paddles
4 Fabric
5 Lotto
6 Magnasticks
7 Magnifying glass
8 Numbers & letters
9 Pegs & boards
10 Picture dominoes
11 Puzzles, simple & complex
12 Rig-a-jig
13 Rubber shapes
14 See-questions
15 Scribble sticks
16 Snap blocks
17 Styrofoam construction blocks
18 Toy Village
19 Wooden dominoes

Table 1 (Cont'd.)

Toy Groupings

Art (A)	Blocks (B)	Dramatic (D)	Manipulative/Books (M)
		12 Stove	
		13 Suitcase	
		14 Telephones	
		15 Cradle	

Table 2

Randomization Schedule for Location of Toys

Toys were divided into four groupings, Art materials, Block-play materials, Dramatic toys and Manipulative toys and books. On each of the eight days of filming, toy groupings were randomly assigned to the four areas in the following manner:

Day 1	7-09-68	1 Art 2 Block 3 Dramatic 4 Manipulative
Day 2	7-10-68	1 Block 2 Art 3 Manipulative 4 Dramatic
Day 3	7-11-68	1 Art 2 Dramatic 3 Block 4 Manipulative
	*7-16-68	1 Art 2 Dramatic 3 Manipulative 4 Block
Day 4	7-17-68	1 Manipulative 2 Art 3 Block 4 Dramatic
Day 5	7-18-68	1 Dramatic 2 Art 3 Manipulative 4 Block
Day 6	7-23-68	1 Block 2 Art 3 Manipulative 4 Dramatic
Day 7	7-24-68	1 Art 2 Manipulative 3 Block 4 Dramatic

* (Note: The film for 7-16-68 was unusable, so that day was ommitted from the data.)

TABLE 3

Activity Coding Form

Location of Activity Areas

								1	2	3	4	
No.		Day		Year	Child		Obs.					

Name of Child _____

Observer _____

1	2	3	4	5	6	7	8	9	10	11
1 2	3 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22
12	13	14	15	16	17	18	19	20	21	22
23 24	25 26	27 28	29 30	31 32	33 34	35 36	37 38	39 40	41 42	43 44
23	24	25	26	27	28	29	30	31	32	33
45 46	47 48	49 50	51 52	53 54	55 56	57 58	59 60	61 62	63 64	65 66
34	35	36	37	38	39	40	41	42	43	44
67 68	69 70	71 72	73 74	75 76	77 78	79 80	81 82	83 84	85 86	87 88
45	46	47	48	49	50	51	52	53	54	55
89 90	91 92	93 94	95 96	97 98	99 100	101 102	103 104	105 106	107 108	109 110

Activity Area Coding --

A = Art
B = Block
D = Dramatic
M = Manipulative/Books
T = Teacher
2/3 = In-Between Area

Toy Coding - on separate sheet

Table 4

Time Spent in Physical Locations

	Physical Location	
	Area 1 & 4	Area 2 & 3
Mean number of 30-second intervals	151.86	408.43

F = 30.73 (P<.01)

Table 5

Time Spent in Activity Areas

	Art	Block	Dramatic	Manipulative
Mean Number of 30-second Intervals	115.14	116.71	65.86	107.86

F = 0.9611 (P>.05)

Table 6

Time Spent in Activity Areas Alone and with Other Children

	Activity Area			
	Art	Block	Dramatic	Manipulative
(A) Mean Number of 30-second Intervals Spent Alone	22.86	23.14	21.00	34.14
(B) Mean Number of 30-second Intervals Spent With Other Children	92.29	94.86	44.86	73.71

(A) $F = 0.4470$ $(P > .05)$

(B) $F = 1.7725$ $(P > .05)$

Table 7

Time Spent in Physical Locations Alone and with Other Children

	Physical Location	
	Areas 1 & 4	Areas 2 & 3
(A) Mean Number of 30-second Intervals Spent Alone	36.43	112.14
(B) Mean Number of 30-second Intervals Spent With Other Children	113.57	313.86

(A) $F = 33.82$ $(P < .01)$

(B) $F = 23.60$ $(P < .01)$

Table 8

Time Spent with Toys

	Activity Areas			
	Art	Block	Dramatic	Manipulative
(A) Mean Amount of Time Spent With Toys Inside Area of Origin	153.71	75.29	82.86	151.86
(B) Mean Amount of Time Spent With Toys Outside Area of Origin	6.14	35.57	52.00	163.43
(C) Mean Amount of Time Spent With Toys, Both Inside and Outside Area of Origin	159.86	110.86	134.86	315.29

(A) F = 1.98 (P > .05)

(B) F = 25.47 (P < .01)

(C) F = 7.46 (P < .01)

Table 9

Mean Number of Different Toys Used/Day

	Days						
	1	2	3	4	5	6	7
Mean Number of Different Toys Used (Sig.05, F 6, 36=3.13)	12.00	8.86	9.00	6.71	11.14	6.29	6.71

F = 3.13 (P = < .05)

Table 10

Mean Number of Different Toys, within

Toy Groupings, Used/Day

	Days						
	1	2	3	4	5	6	7
(A) Mean Number of Different Art Materials Used	1.71	3.25	1.57	1.86	2.42	1.71	0.14
(B) Mean Number of Different Block Toys Used	4.57	1.86	3.57	1.14	3.86	0.86	2.14
(C) Mean Number of Different Dramatic Toys Used	4.57	1.86	3.57	1.14	3.86	0.86	2.14
(D) Mean Number of Different Manipulative/Books Used	4.57	3.57	2.86	2.29	4.00	3.29	2.57

(A) F = 2.11 (P = .05)

(B) F = 2.46 (P = .05)

(C) F = 3.46 (P = .01)

(D) F = 4.97 (P = .01)

Table 11

Toy Movement to Specific Physical Locations

	Physical Location	
	Areas 1 & 4	Areas 2 & 3
Mean Number of Times Toys Were Moved	64.43	202.43

F = 8.48 (P .05)

Table 12

Population Density - Total Number of Appearances

in Specified Activity Areas

	Activity Areas				
	Block	Art	Games (Manip/Book)	Doll (Dramatic)	Book
Total Number of Appearances/Area					
(A) Shure	772	490	323	316	205
(B) Holt	464	461	406	275	-

(A) $F = 463.55$ $(P = < .001)$

(B) $F = 58.45$ $(P = < .001)$

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